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Cinder Concrete Building Units

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FOREWORD

THE CINDER CONCRETE BUILDING UNIT is manufactured under the well-known STRAUB and Bo patent requirements. It is a composition of Portland Cement and carefully selected or specially purified cinders, crushed to the proper fineness. These materials—thoroughly mixed and molded under heavy pressure—are manufactured into building units of the standard shapes and sizes required by modern building practice.

Since the issue of the STRAUB patent over 80 plants devoted to the manufacture of these products have been established in the United States and Canada. Continued study of the quality factors of the material—careful control—and quantity production have made it possible to offer CINDER CONCRETE BUILDING UNITS to the Building Trade at a cost which successfully competes with that of any other masonry material.

CINDER CONCRETE BUILDING UNITS, in the form of block, brick or tile, are identified with the names of STRAUB and Bo, and as such have been recognized as standard masonry in practically all of the largest cities. The combination of these two patents makes it possible for the authorized plants to adopt the method most suitable for the raw material and to produce a uniform product throughout the country.

The NATIONAL BUILDING UNITS CORPORATION is the owner of the STRAUB and Bo patents. It has compiled this book on CINDER CONCRETE BUILDING UNITS in order to present the Architect, Contractor or Prospective Builder with general information regarding the product and its many uses.

Additional data will be furnished by any of the subsidiary or licensed plants, listed on page 35, or by the Engineering Department of the National Company.

NATIONAL BUILDING UNITS CORPORATION
1600 ARCH STREET
PHILADELPHIA



CINDER CONCRETE BUILDING UNITS

THE WALL



WALLS have two functions—to support and to protect. Almost any masonry material that goes into wall construction has sufficient strength for load-bearing. CINDER BLOCK and CINDER TILE—with a high crushing strength of the individual unit and an unusually high degree of wall efficiency—give a safety factor far in excess of the requirements for general construction.

But strength is only one factor in modern wall design; a vital factor, but not at all a remarkable one. The PERFECT WALL must possess other advantages.

The PERFECT WALL must be permanent. It must be immune to the common causes of deterioration in building materials, such as wind and rain or freezing and thawing. It must be fire resistant—not merely incombustible, but retaining its strength and stability when exposed to intense heat or to the sudden and repeated application of cold water.

Under the most severe exposure the wall must insure comfort through its insulative character and its resistance to dampness. In our North American climate, changing from month to month, sometimes from day to day, there is real necessity for buildings that will retain an even temperature, free from outside changes. This is one of the requirements of the PERFECT WALL.

Modern conditions demand that the wall provide privacy through protection against outside noises. Sound insulation has therefore become a matter of the greatest importance in building design—particularly when considering partitions in apartments, office buildings, schools or hospitals.

And—in order to be practicable for extensive construction, the WALL must not be prohibitive in cost.

CINDER CONCRETE BUILDING UNITS embody the requirements of the PERFECT WALL. In these units, structural strength is combined with a cellular insulative structure. While light of weight, they meet the specifications for load-bearing walls. Fire-resistant and time-proof, they have the added advantage of sound absorption as part of the wall itself. And these features are obtained at a cost which compares favorably with that of any other masonry unit.

§ § CINDER CONCRETE BUILDING UNITS § §

PRODUCTS



ON this page are illustrated some of the popular sizes of CINDER BLOCK and CINDER TILE. Generally, the units cover a wall area of 8" x 16", and have a standard thickness of 3, 4, 6, 8, 10 and 12 inches. Reinforced lintels are made of the required dimensions and in a wide range of lengths.

Brick, half block, quarter block, jamb block, sash block, header block, corner block and solid slabs are furnished for use in connection with standard units. They are of great importance in simplifying erection

General data regarding these units will be found on pages 24 and 25. Reference is made to the price list of the plant for information on all sizes carried in stock.



CINDER CONCRETE BUILDING UNITS

OUTSTANDING FEATURES



THE characteristics of CINDER CONCRETE BUILDING UNITS, as described in this book, may be summarized in the following few paragraphs:

1—*Light Weight*

Easy to handle, being 40-50% lighter than brick or sand concrete blocks. This speeds up the laying and reduces the dead weight of the wall. An ideal material for curtain walls and partitions in tall buildings where lightness is a necessity.

2—*Strength*

The unit meets the requirement of the building code and possesses high structural efficiency. The strength of the unit is imparted to the wall itself through the full development of the mortar bond. The toughness of the material eliminates waste due to breakage.

3—*Fire Resistance*

Unique fire resistance established by hundreds of tests and actual fires. The structural stability of the wall is unimpaired by prolonged exposure to heat or by the sudden cooling when water is applied. Salvage value practically 100%.

4—*Time-Proof*

Strength increases with age. Changes in temperature or in the humidity of the atmosphere do not affect the material, and repeated freezings and thawings do not reduce its strength. Used extensively in foundation walls exposed to the dampness of the soil.

5—*Insulation*

The cork-like structure of the material builds insulation into the wall. It insures an even temperature within the house all year 'round and effects a substantial saving in fuel. The insulative nature makes lining with special insulating materials unnecessary.

6—*Damp-Proof*

The insulative character prevents condensation on the wall and the limited capillary attraction eliminates the danger of moisture being drawn through the wall from the outside. Furring strips and lathing are unnecessary. Buildings are always dry and conducive to good health.

7—*Sound-Insulation*

Walls of this material absorb sound. The acoustics of large rooms are substantially improved by the reduction of sound reverberation. Cinder tile partitions insure privacy by practically eliminating transmission of sound.

8—*Nailing and Cutting*

Nails can be easily driven into the wall, will grip firmly and will never rust. Nailing strips and plugs are eliminated and all grounds or trim may be fastened direct. The units can be cut or channeled without breakage or waste.

9—*Plastering Surface*

Trueness of wall, rough surface and even suction facilitate plastering and reduce waste to a minimum. The adhesion is permanent and there is no danger of staining or cracking.

10—*Economical*

The utmost in building permanence with economy. For a discussion of economy of construction, see page 18.

GENERAL USE



Residence, Detroit, Mich. Cinder Block used for basement and all exterior walls. Plastered and stuccoed direct.



Security Building, Denver, Colo. Fisher & Fisher, Architects. Alex Simpson, Jr., Company, Contractors. Cinder Tile partitions throughout.



By insuring dryness, Cinder Block foundations add another livable floor to the house.

THE entire field of masonry construction is covered by CINDER CONCRETE BUILDING UNITS. Suitable sizes are standardized for use in load-bearing walls, above or below grade, in curtain walls, in partitions and in all types of permanent construction. These units may be used either exposed or as backing for brick, stone or stucco.

Residence construction, in which these units were first employed, gave unmistakable evidences of the almost infinite adaptability of the material and the economies in construction made possible by its use. Architects and Builders, appreciating these advantages and possibilities, soon specified CINDER CONCRETE BUILDING UNITS in all types of buildings.

The use of CINDER BLOCK in foundations became general. The practical addition of a new floor to the house because of the dryness of this type of basement wall was a feature that appealed strongly to owners everywhere, adding to the impression already created by the insulative features and by the permanence of the material.

The larger types of modern construction requiring height have brought the factors of strength and lightness into prominence. CINDER CONCRETE BUILDING UNITS have found wide-spread use in walls up to fifty feet in height, as load bearing units. The reduction of dead weight, increased stability and high wall efficiency are the important factors in these forms of construction.

An important field has been opened for Cinder Concrete through the development of Partition Units and Backing Tile that meet every requirement of modern skyscraper construction. The lightness and economy of CINDER CONCRETE BUILDING UNITS are here equaled in importance by the unique sound insulation possessed by this material.



CINDER CONCRETE BUILDING UNITS

LIGHT OF WEIGHT



A STANDARD 8x8x16" CINDER BLOCK weighs 32 to 34 lbs. as compared to approximately 50 lbs. for a sand concrete block. It equals in the wall 12 brick, weighing close to 60 lbs.

LIGHTER CINDER CONCRETE UNITS are made for non-bearing partitions and curtain walls.

100 square feet of 8" wall will require the following weights of units:

- 3600 lbs. of cinder blocks.
- 5500 lbs. of sand concrete blocks, or 50% more.
- 6500 lbs. of clay brick, or 80% more.

It is apparent that there must be a considerable difference in the speed of handling these different weights, and it is quite possible to figure this variation under given conditions and labor costs.

The lightness of CINDER CONCRETE BUILDING UNITS reduces the dead weight of the wall. This is of particular advantage in the construction of curtain walls and partitions, effecting marked economy in erection. The weight on the footing is reduced, and with CINDER BLOCK and TILE there is less danger of cracks due to settling.

For a two-story residence built of 8" CINDER BLOCKS above grade and 12" CINDER BLOCKS below, the safety factor will be in excess of 40, assuming normal loads on floors and roof. For a four-story apartment 50 ft. in height, the safety factor will still be considerably in excess of 10, due to the lightness and strength of CINDER CONCRETE BUILDING UNITS.

Ocean Court Apt., Ocean City, N. J. Cinder Blocks in load-bearing walls ready for stucco.



Rochester Gas & Electric Corporation, Heating Plant, Rochester, N. Y. Wall 80' (120 courses) high, built of 8" and 12" Cinder Block. Brick Veneer on front. Other side of cinder block, unretained since Spring, 1925.

WEIGHT PER CUBIC FOOT:	
54 POUNDS	HOLLOW CINDER UNIT
54 POUNDS	HOLLOW CLAY TILE
80 POUNDS	SOLID CINDER UNIT
84.5 POUNDS	HOLLOW CONCRETE UNIT
125 POUNDS	CLAY BRICK
136 POUNDS	SOLID CONCRETE

CINDER CONCRETE BUILDING UNITS

S T R E N G T H

CINDER CONCRETE BUILDING UNITS meet the requirements of the most rigid building codes. These units are subjected to tests at regular intervals and the manufacturing license requires a strength, at the age of 28 days, of not less than 700 lbs. per square inch of gross area, or whatever strength is required by the building code.

WALL EFFICIENCY

RATIO OF STRENGTH OF WALL-
TO STRENGTH OF UNIT

CINDER BLOCK: 66.8 %

CLAY BRICK: 25 %

Generally, this requirement is greatly exceeded and hollow CINDER BLOCKS have been made to stand a pressure of more than one ton per square inch. This strength, however, is never required in masonry unit construction.

The strength of the masonry unit should always be considered in its relation to the strength of the wall. The essential factors in

imparting this unit strength to the wall itself are the quality of the mortar and its adhesion to the unit.

With CINDER BLOCK the mortar bond develops its full strength. The limited suction of the unit prevents drying out, and the wide mortar bed has a rough-textured surface which gives a perfect key.

A large number of tests on Clay Brick walls, as reported by the Hoover Building Code Committee, show an average wall efficiency (ratio of wall strength to unit strength) of 25%, while tests made by Columbia University on CINDER BLOCK piers, as quoted on this page, show an average wall efficiency of 66.8%.



COLUMBIA UNIVERSITY
DEPARTMENT OF CIVIL ENGINEERING
New York City, December 20th, 1923. Report No. 1353

Abstract of Report on Compression Tests on Cinder Block Piers

Height of Pier	Size Unit	Compressive Strength of Pier	Compressive Strength of Unit	Ratio
54.1"	8 x 8 x 16"	704 lbs. per sq. inch	927 lbs. per sq. inch	.758
53.8"	8 x 8 x 16"	649 lbs. per sq. inch	927 lbs. per sq. inch	.700
54.0"	8 x 12 x 16"	719 lbs. per sq. inch	1315 lbs. per sq. inch	.547



When haste is imperative, dumping direct from the trucks may be employed with safety.

The toughness of cinder concrete should also be considered here. This characteristic eliminates waste due to breakage, for the units may be dumped from trucks without damage except for the possibility of a few broken corners.

C I N D E R C O N C R E T E B U I L D I N G U N I T S

FIRE RESISTANCE



NO single feature of CINDER CONCRETE BUILDING UNITS has been more completely established than their unusual fire resistance.

The term "fire-resistant" embraces several factors almost equally important. Resistance to flame is vital. Prevention of heat transmission, and the cohesive character of a wall that neither bulges nor cracks, are equally essential. After the fire, the salvage value of the wall assumes primary interest.



Ruins of Buffalo factory of Teasbutt Lumber Co., January 1923. Cinder Brick chimney undamaged by fire. Note effect of intense heat on steel beams.

Cinder concrete, made by the proper method, offers not only a high degree, but also the most inclusive form of fire resistance, and its remarkable salvage value is a factor on which great stress should be placed

Tests of every kind, and practical experience in many actual fires have established the fire resistance of cinder concrete. This material, while intensely hot on its exposed surface, will withstand sudden and repeated application of cold water without cracking or weakening of the wall.

Tests made by the Laboratories of the National Board of Fire Underwriters clearly illustrate these well-established facts.



(ABOVE). "Many blocks in the exposed walls were tested with blows from a hammer and they rang as clearly as new blocks when struck. It should not be necessary to replace any blocks either for safety or because of their appearance." Excerpt from letter from Rudolph P. Miller, Consulting Engineer, New York, written after examination of buildings exposed to fire at Tenafly, N. J.

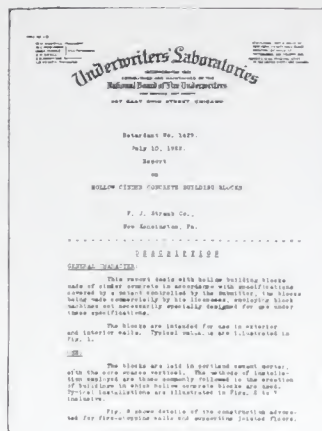
(LEFT). Hollow 5-inch Cinder Block wall, exposed to full force of three and one-half hour fire at Tenafly, N. J.

FIRE RESISTANCE

At the Underwriters' Laboratories, CINDER BLOCK walls were submitted to fire test, fire and water test, and the so-called "impact test", where the wall is subjected twice to the impact of a heavy steel and concrete member following the exposure to fire and water.

In these fire tests, 8" CINDER BLOCK panels 10'-1" wide and 11'-3" high, formed the front wall of a gas furnace. The temperature of this furnace reached 1300° F. in 10 minutes and more than 1900° F. in 3 hours 15 minutes when the unexposed face of the CINDER BLOCKS registered an average of 300° F. The blocks showed no spalling, cracking or structural damage, and the maximum deflection of the wall, due to heat expansion, was less than 1/2".

In the remarkable fire at Tenaflly, N. J., a hollow 5-inch wall of CINDER BLOCKS resisted a wind-driven fire that endured for three and one-half hours. This is an instance of all the qualities included in the term "fire-resistant". An average of 500 gallons of water a minute was directed against the heated wall surface, creating an unusual condition of contraction and expansion. After the fire there were no evidences whatever of heat penetration. The wall, three stories in height, was undeflected and uncracked. Every cinder block was fit for use again.



(ABOVE). 3" Cinder Tile used in fire-proofing all steel members of Ararat Shrine Temple, Kansas City. See page 21, illustrating general construction of Proscenium wall and back-stage walls.



(RIGHT). 8" Cinder Block used in construction of modern fire-proof vault.

CINDER CONCRETE BUILDING UNITS

TIME-PROOF



A BUILDING material may deteriorate with age mainly because of expansion of the water contained in its pores when this water freezes. An increase in volume of approximately 10% takes place when water is changed into ice. If the building material, or a portion of it, is completely saturated, serious cracking may occur.

This will never happen with CINDER CONCRETE BUILDING UNITS because of the cellular structure of the cinders. The pores of the aggregate will always contain a certain amount of air, and if the water in the wall freezes, the air pockets allow for expansion so that no stresses occur which break the bond of cement holding the particles together.

Numerous laboratory tests show that CINDER BLOCK and CINDER TILE actually gain in strength by repeated freezing and thawing. The gain must be due to a further hydration of the cement, and the real significance of these tests lies in the fact that no loss in strength results.



Nail embedded for nine years in Cinder Block showing perfect condition upon removal, and typical of the protection afforded by Cinder Concrete made under Straub and Bo Patents.

Freezing and thawing tests are usually conducted by submerging the specimen in water, freezing it, then thawing it in hot water. These alternate freezings and thawings are repeated a definite number of times, usually twenty. The strength is determined before and after the treatment. CINDER CONCRETE BUILDING UNITS have been subjected to as many as forty-two freezings without any loss in strength.



Camp Brady, Michigan. This Boy Scout Camp is built entirely of Cinder Block, left exposed for architectural effect and economy.

Other causes of deterioration in building materials may be the

CINDER CONCRETE BUILDING UNITS

TIME-PROOF

effect of wind and rain or chemical processes which may appear in the course of time.

CINDER CONCRETE BUILDING UNITS increase in strength with age, as shown by tests on blocks taken from the walls of old buildings. An extensive investigation conducted by the Pittsburgh Testing Laboratory is summed up in the following conclusion:

"As a result of our investigation, and finding that Straub Cinder Concrete Blocks have been used for a period of upwards of nine years, with absolutely no evidence of disintegration or deterioration, there can be no question as to the durability of such blocks." Report dated November 2, 1925.



8" Cinder Block used in Manhole construction by Rochester Gas & Electric Corp., Rochester, N. Y., at marked economy over similar construction with brick



FREEZING AND THAWING TEST MADE UPON CINDER CONCRETE TILE

The tile used in this test were taken from a lot selected and marked by the Bureau of Building, City of New York, represented by Mr. T. Heatley, Borough of Bronx.

The specimens were dried to constant weight and immersed in water four hours, after which they were placed in a refrigerator maintained at a temperature of 6° F and allowed to remain for 23 hours. They were then removed and placed for one hour in water having a temperature of 150° F. At the end of this thawing period, the specimens were again placed in the refrigerator and frozen as above and again thawed, thus causing the tile to be alternately frozen and thawed once every twenty-four hours. The test consisted of twenty such alternate freezings and thawings. At the end of this freezing test, the specimens were again dried to constant weight and the compressive strength determined.

Test Number	28551	28549
Size of Unit	8x8x16	8x12x16
Average strength after freezing, pounds per square inch gross area	1,123	1,529
Average strength before freezing, pounds per square inch gross area*	915	1,152
Gain in strength	22.7%	32.6%

Note: *These values were obtained from average test made on tile, taken from the same lot and covered by tests, numbers 27517-19 and 27524-26, dated September 2, 1924.

During the careful mixing processes employed under the STRAUB and Bo Systems, the particles of cinders are completely coated with strongly alkaline cement. If any acid had formed by oxidation of sulphur compounds, it would be neutralized instantly.



Cinder Block after repeated freezings and thawings, showing ice at water line.

As a matter of fact, nails embedded in CINDER BLOCK and CINDER TILE have a holding power that increases with age. They show no sign whatever of rusting.

CINDER CONCRETE BUILDING UNITS

INSULATION



THE cellular, cork-like structure of the CINDER CONCRETE BUILDING UNIT creates an insulation that forms an integral part of the load-bearing wall.

This cellular structure is developed by the methods of crushing and grading employed in the STRAUB and Bo processes. The large hollow spaces in the block and tile are for the purpose of lightening the product; it is the small air cells, structurally strong and containing dead air, that give the unit its distinguishing insulative character.



*United States Government Lighthouse, Milwaukee, Wisconsin.
Cinder Blocks in outside walls for insulation, and
Cinder Tile in all partitions.*

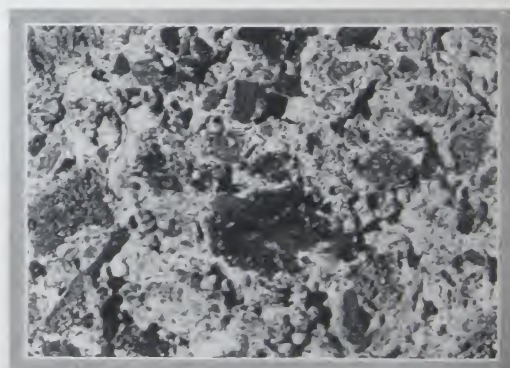
The COEFFICIENT OF HEAT CONDUCTIVITY for a typical 8 x 8 x 16" CINDER BLOCK as determined by E. L. Conwell & Co., Philadelphia, Pa., is 1.77. This means that 1.77 British Thermal Units will flow per hour through one square foot of the block when the difference in temperature

is 1 degree Fahrenheit per 1 inch thickness. Compare this with the coefficient for other materials as quoted in standard text books

The benefits gained by the insulative character of CINDER CONCRETE BUILDING UNITS may be summarized as follows:—

First, A SAVING IN FUEL. The heat loss through the wall is substantially reduced because of the insulation of the wall itself.

Second, ELIMINATION OF DAMPNESS. Changes in outside temperature are slow in affecting a



Magnified cross section of Cinder Block, showing cellular structure, which produces high degree of insulation. Note minute air-cells in particles of aggregate.

CINDER CONCRETE BUILDING UNITS

INSULATION

wall of this material, and there is no danger of condensation of the moisture contained in the air of the heated interior.

Third, **ECONOMY OF CONSTRUCTION.** The insulation as an integral part of the wall itself makes lining with special insulative materials unnecessary. All necessity for furring and lathing is eliminated.



Residence at Rochester, N. Y. Leander McCord, Architect. Cinder Blocks, with stucco and plaster applied direct, produce high degree of insulation.

Fourth, **INCREASED COMFORT.** The maintenance of even temperature all year round, and the absence of dampness, are important factors when considering the comfort of any building.



Extensive use for **CINDER BLOCK** and **CINDER TILE** has been found in ice houses and refrigerators where a low temperature must be maintained, and in dry kilns, cold storage houses, etc. These special uses emphasize the commercial and economic possibilities inherent in this material.

THE MIDWEST ORCHARD SERVICE WRITES:

The success we have had in the operation of our Air-Cooled Storage prompts us to write you in regard to the insulating efficiency of your cinder-cement block.

During the past winter season, a temperature of 34 degrees was maintained for over four months, with but slight variation, and our ventilating system controlled both humidity and temperature so well that the apples were kept in a firm sound condition. No apple scald or shriveling was apparent on any varieties.

The writer has inspected many similar storages constructed of hollow tile, concrete, brick and so forth, but in no case have they proven as efficient as our own structure built of the cinder-cement block. A great many growers from the Middle West have already visited our plant. Everyone has been most favorably impressed and many have ordered plans, intending to build similar structures.



Ice House at Pueblo, Colo., built of 12" Cinder Blocks, exposed on outside and lined with 1 1/2" of insulating material and one layer of 200 lb. burlap lined to the wall. More than 40,000 units used in this structure.

CINDER CONCRETE BUILDING UNITS

DAMP-PROOF



THERE are two causes for the dampness or sweating that appears on the interior of some walls. The first is condensation of moisture on a cooling wall. The second is the capillary action that draws moisture through the wall from the outside.

Dampness collecting on the outside of a pitcher of ice water in a heated room is an ordinary example of the first phenomenon. The

second is illustrated by dipping the end of a lump of sugar in coffee, when the liquid is drawn up through the sugar by capillary attraction.



*Residence, Baltimore, Md. A. C. Leach, Architect.
Plaster applied direct to walls.*

As stated on the foregoing page, condensation may be eliminated by erecting the wall with CINDER CONCRETE BUILDING UNITS. The temperature of the wall is slow in changing, and moisture remains suspended in the air of the room without reaching the "dew point", which is the point of saturation.

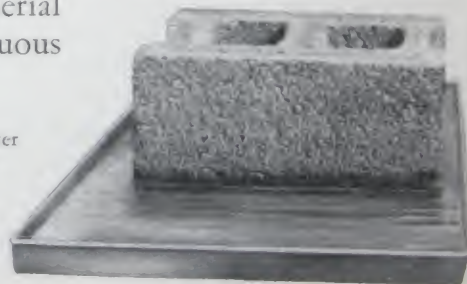
Dampness is not merely destructive to plaster, it is highly injurious to health. This dangerous condition is effectively prevented by construction with CINDER CONCRETE BUILDING UNITS and it is therefore safe to plaster direct on a wall of this material. Furring and lathing are not necessary.

It should be remembered that only the cinder concrete part of the wall resists moisture. For that reason all units should be laid without continuous cross joints, as shown on page 30. If the wall is veneered with brick or stone, the facing material should not at any point be continuous through the wall.

Illustrating a Cinder Block partly submerged in water

The water in the pan will not rise more than one inch to two inches in the unit, even though the block remains partly submerged for a month. Capillary attraction in Cinder Concrete is extremely slight.

If this Cinder Block in the pan of water were turned 90 degrees, it would represent a wall, wet on the outside from heavy rain. This water does not come through the wall, because of the limited capillary force. This action is quite different in sand concrete or common clay units.



CINDER CONCRETE BUILDING UNITS

SOUND INSULATION

ACOUSTIC design is of great importance in the construction of buildings. It involves both the reduction of disturbing reverberation in large rooms, and the elimination of sound transmission from one room to another. In order to perform these two acoustic functions, the preventing of reflection and transmission, the wall must absorb the sound.

CINDER CONCRETE BUILDING UNITS meet acoustic requirements to a remarkable degree. In the construction of auditori-

ums, CINDER BLOCK and CINDER TILE reduce the time of sound reverberation within the room so that the wall itself performs the function of special sound deadening materials.

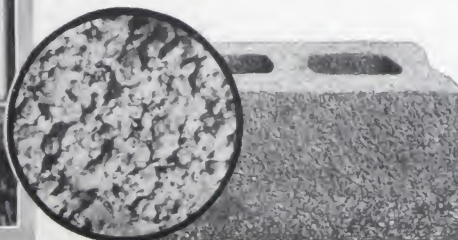
As partition tile in apartments, hotels, hospitals, schools or residences, CINDER CONCRETE BUILDING UNITS reduce the transmission of sound to a minimum by their built-in sound absorption.

The stability of walls of CINDER BLOCK and CINDER TILE together with the cellular structure of the material account

for these important features of sound insulation. A technical bulletin dealing with the sound absorption of CINDER CONCRETE BUILDING UNITS has been issued by the National Building Units Corporation and will be furnished upon request.



*Cosmopolitan Hotel, Denver Colo. Wm. N. Bowman Co., Architects.
Gordon M. Tambllyn, Contractor. 350,000 Cinder Block and
Cinder Tile used in back-up and partitions.*



Interior of Players' Theatre, Detroit, Mich. Smith, Hinchman & Grylls, Architects. Feuchtel Sheehan, Builders. Walls of Cinder Block and Tile laid in random design and covered with one brush coat of paint to secure attractive interior and improved acoustics.

Detail showing rough surface texture which gives high degree of sound absorption.



CINDER CONCRETE BUILDING UNITS

NAILING AND CUTTING



NAILS can easily be driven into CINDER CONCRETE BUILDING UNITS. The nails will hold firmly and will never rust. Actual tests have shown the holding power to be equal to that of yellow pine, and that this holding power increases with age.

All nailing strips and plugs are eliminated. Grounds, base boards and trim may be fastened direct to the wall. The contractor will readily appreciate the saving due to this feature.



The wood plugs generally used with clay brick, clay tile or sand concrete will dry out, shrink and loosen. The initial cost is high and the lasting quality is doubtful. The direct nailing to a wall of CINDER BLOCK or CINDER TILE is far more satisfactory.

No difficulty is experienced in cutting or channeling the material, due to the cellular structure of the cinder concrete. Breakage is eliminated.

To further facilitate construction, CINDER CONCRETE BUILDING UNITS are supplied in halves, quarters and other fractions so that cutting is reduced to a minimum.

PITTSBURGH TESTING LABORATORY

Pittsburgh, Pa. January 12, 1922

Laboratory No. 48544

REPORT OF TEST ON HOLDING STRENGTH OF WIRE NAILS

In order to obtain the holding power of wire nails in Straub cinder building blocks as compared with wood, samples were placed in a Universal testing machine and the loads required to draw the nails determined.

Size of Nail	Material Used	RESULTS OF TEST	Depth of Nail in Material	Load in Lbs. Required to Draw Nails
20 d—2 x 4 Yellow Pine			1½	260
16 d—2 x 4			1½	270
20 d—Cinder Concrete Block			1½	300
20 d—	"		1½	250
20 d—	"		1½	200
16 d—	"		1½	200
*20 d—Old Nail in Cinder Concrete Block 5 years			1½	650

Note: *This specimen was a nail which had been driven into a cinder block used in the walls of a bottling plant at New Kensington, Pa. When the building was partly destroyed by fire, this specimen was selected to determine the effects of age on the holding power of the nail. The nail had not rusted in the cinder concrete, although it had rusted where not embedded.

PITTSBURGH TESTING LABORATORY,
P. J. Freeman, Engineer of Tests

CINDER CONCRETE BUILDING UNITS

PLASTERING SURFACE

THE surface texture of CINDER BLOCK and CINDER TILE affords an ideal base for plaster and stucco. These materials are applied direct to the wall and dovetail into the small irregularities of the surface, giving a very strong key.

The bricklayer has no difficulty in making a true wall with these units, and only a very thin straightening coat of plaster is required. The firm adhesion eliminates waste of plaster during application.

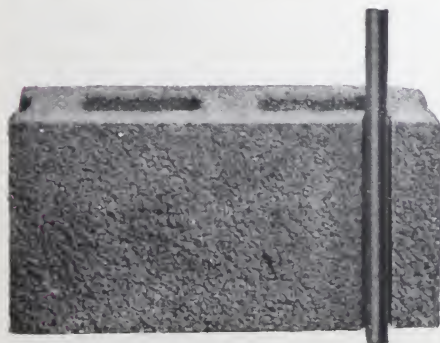
CINDER CONCRETE BUILDING UNITS have an even absorption—quick but limited—which enables the plasterer to work much faster than is possible on any other base... Each square foot of plaster sets up with the same



Outside walls of Cinder Block, laid in broken ashlar design and painted.

speed and the whole surface is uniform for rodding and floating.

These characteristics, the trueness of the wall, the evenness of the suction and the splendid key afforded by CINDER BLOCK and CINDER TILE, effect a decided economy in plastering. To these advantages should be added the nailing feature, which simplifies the placing of grounds and the fastening of interior trim.



The rough surface, combined with the trueness of the CINDER BLOCK or CINDER TILE unit, makes possible the application of paint in a variety of attractive effects. To enhance the pleasing quaintness of a white-washed surface, the units may be laid in broken ashlar or random design.



CINDER CONCRETE BUILDING UNITS

ECONOMY of CONSTRUCTION



THE characteristics of CINDER CONCRETE BUILDING UNITS, as described on the foregoing pages, effect decided economies in construction which may be summarized as follows:

Laying:

In comparison with sand concrete blocks or common brick, the lighter weight of CINDER CONCRETE BUILDING UNITS makes possible a substantial saving in masonry labor. The weight is the same, or less, than ordinary clay tile, but the wider mortar bed and the trueness of the units are in favor of CINDER BLOCK and CINDER TILE. There is no difficulty in keeping the wall plumb during erection.

Mortar:

One 8 x 8 x 16" CINDER BLOCK takes the place of twelve brick in the wall—with a subsequent saving in the amount of mortar used. CINDER BLOCK and CINDER TILE require less mortar than clay tile because the wider webs reduce the loss of mortar.

Reducing Dead Load:

The lightness of the product reduces the dead weight of the wall—and CINDER BLOCK and CINDER TILE are particularly well adapted to skyscraper construction where weight becomes a deciding factor. A saving in load-bearing members of skeleton construction is possible with this material.

Elimination of Lath:

All plaster is applied direct to a wall of CINDER CONCRETE BUILDING UNITS. There is no danger of dampness or discoloration when the wall is properly constructed. Furring and lathing can be omitted with a very substantial saving.

Economy of Plaster:

A wall of CINDER BLOCK or CINDER TILE presents an even surface requiring only a thin scratch coat of plaster under the finishing coat. Waste is eliminated, and the rough surface of the wall makes an ideal bond for the plastic material.

Plastering Labor:

The quick but limited suction and the even absorption of CINDER CONCRETE BUILDING UNITS make it possible for the plasterer to work with greater speed. The saving in time is an important economy.

No Breakage:

The toughness of CINDER CONCRETE BUILDING UNITS reduces breakage to a minimum and the fractional sizes reduce cutting.

Nailing:

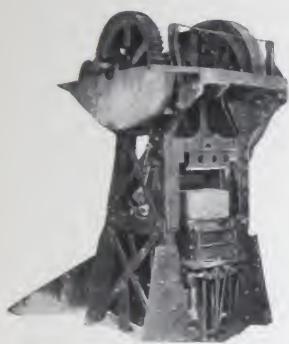
All grounds and trim are nailed direct to the wall of CINDER BLOCK or CINDER TILE. Nailing plugs are eliminated at a substantial saving in labor, and the direct nailing is far more satisfactory.

The human element that enters into building makes it difficult to express economy of construction in terms of dollars and cents, but the architect or builder who has once used CINDER BLOCK and CINDER TILE will recognize their economy advantages in actual construction.

CINDER CONCRETE BUILDING UNITS

MAKING THE PRODUCT

THE quality of such products as CINDER BLOCK or CINDER TILE depends greatly upon correct methods of manufacture. A vital contribution of the inventors, Straub and Bo, was their early recognition of the quality factors that govern the making of CINDER CONCRETE BUILDING UNITS.



Automatic machine of special design used in the manufacture of Cinder Concrete Building Units.

Cinder Block Plants operating under the Straub and Bo Patents are equipped to treat the raw material in such a manner as to assure a standardized product. The careful crushing processes produce an aggregate which is structurally sound and durable. Thorough mixing and specially developed methods of manufacture insure a product of uniform quality.

The Cinder Concrete produced by these plants is protected by the proper conditions of temperature and moisture during its early life and is thoroughly seasoned before delivery to the job.

Quantity production and the maintenance of an adequate reserve stock are necessary to insure the delivery of properly matured units.

Close co-operation is maintained between all plants operating under Straub and Bo Patents and the Engineering Department of the National Building Units Corporation. The architect and builder are assured of uniform products and the responsible co-operation of a national industry when dealing with any of these licensed and subsidiary plants.



Cinder Block Plant, typical of the more than eighty plants manufacturing Straub and Bo Products throughout the country.

A carefully matured stock, in some plants aggregating more than half a million units, is maintained for immediate delivery.

CINDER CONCRETE BUILDING UNITS



*F*IRST CHURCH of CHRIST, SCIENTIST, Dayton, Ohio. Gebhardt and Shaeffer, Architects. Wm. MacIlroy, Builder. Floors, back-up and partitions of Cinder Block and Cinder Tile.

*B*RITH SHOLAM COMMUNITY CENTER, Bethlehem, Pa. Architect, David Levy Contractor, H. E. Stoudt & Son Cinder Block partitions and backing.

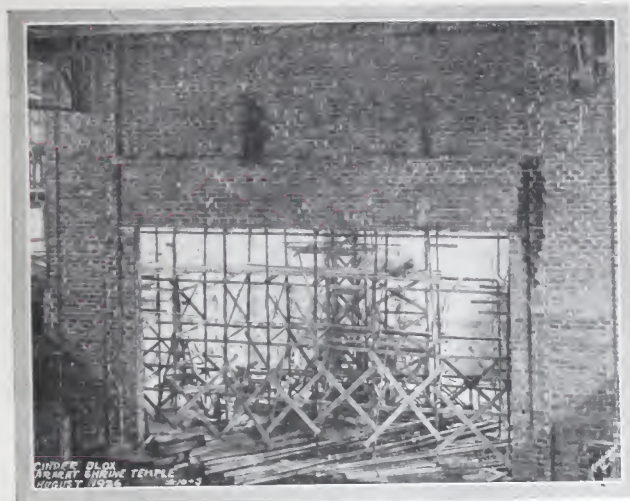


*S*ACRED HEART CHURCH, Pittsburgh, Pa. Carlton Strong, Architect. Duquesne Construction Co., Builders. Cinder Block in exterior walls as backing for stone.

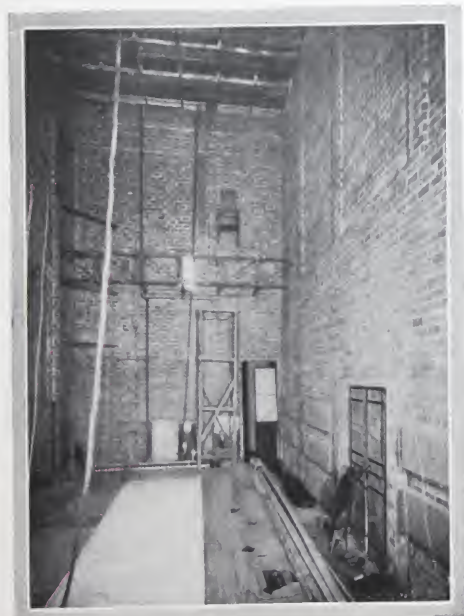
*D*ETAIL of EAGLES CLUB HOUSE, Milwaukee, Wis., showing Cinder Tile Partitions. Note curved wall of Cinder Block at stair landing.



ARARAT SHRINE TEMPLE. Kansas City, Mo. Owen, Saylor and Payson, Architects. Fogel Construction Company, Builders. Stone veneer backed with Cinder Block. All steel fire-proofed with Cinder Block and Cinder Tile. Cinder Tile partitions throughout.



ARARAT SHRINE TEMPLE. Proscenium wall built of Cinder Block. Truss over stage opening fire-proofed with 3" Cinder Tile resting on concrete shoes cast around lower flange.



ARARAT SHRINE TEMPLE. Auditorium seating 2,850. Remarkable acoustics due to Cinder Tile partitions and exposed Cinder Block in all stage walls.

ARARAT SHRINE TEMPLE. Stage walls showing Cinder Block left exposed in order to get a high degree of sound-absorption. Back stage walls 85 ft. high x 76 ft. long. Lower 40 ft. of 12" Cinder Block and 4" brick; Upper 45 ft. of 8" Cinder Block and 4" brick; 20" pilasters set 14 2/3 ft. apart.



TUDOR HALL APARTMENTS, Englewood, N. J.
Architects, Springsteen & Goldhammer. Cinder
Block in load bearing walls as backing for brick,
stone and stucco. Half-timbering nailed direct to
the block.



SOUTH WEST HIGH SCHOOL, Kansas City, Mo.
Chas. A. Smith, Architect. Cinder Block in back-
ing and Cinder Tile in all partitions.

CONTINENTAL OIL COMPANY BUILDING,
Denver, Colo., Wm. N. Bowman Co., Architects.
Gordon M. Tamblay, Builder. Cinder Tile parti-
tions throughout.



APARTMENT HOUSE Toronto, Canada. Craig and
Madill, Architects. Cinder Block in all walls as
backing for face brick.



RESIDENCE, Englewood, N. J. Frohman, Robb and Little, Architects. Built of Cinder Block and Cinder Tile.



RESIDENCE, Indianapolis, Indiana. Pierce and Wright, Architects. Stucco and plaster applied direct to Cinder Block.

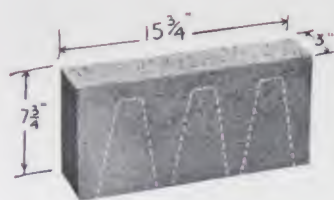


RESIDENCE, Kansas City, Mo. Edw. W. Tanner, Architect. Face brick backed with Cinder Block.

RESIDENCE, Reading, Pa. Scholl and Richardson, Architects. Outside walls of stone, backed up with 4", 8" and 12" Cinder Block. All partitions of Cinder Tile.



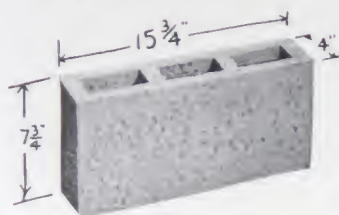
REPRESENTATIVE UNITS



3" Cinder Tile

Nominal size..... 3 x 8 x 16"
 Nominal size..... 3 x 9 x 16"
 Nominal size..... 3 x 12 x 12"
 Weight per sq. ft..... 14-15 lbs.

The tile is made with a solid top to facilitate spreading of mortar.



4" Cinder Tile

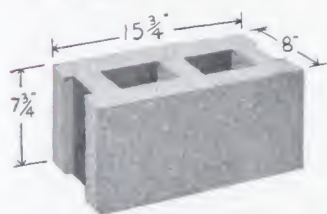
Nominal size..... 4 x 8 x 16"
 Actual size..... 4 x 7 3/4 x 15 3/4"
 Weight..... 15-17 lbs.

Also made solid, or hollow with solid top.



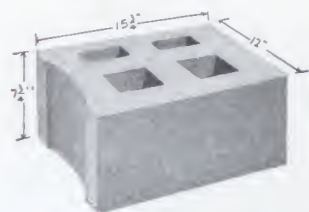
6" Cinder Tile

Nominal size..... 6 x 8 x 16"
 Actual size..... 6 x 7 3/4 x 15 3/4"
 Weight..... 24-26 lbs.



8" Cinder Block

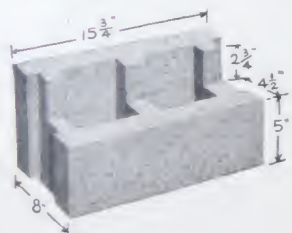
Nominal size..... 8 x 8 x 16"
 Actual size..... 8 x 7 3/4 x 15 3/4"
 Weight..... 32-34 lbs.



12" Cinder Block

Nominal size..... 12 x 8 x 16"
 Actual size..... 12 x 7 3/4 x 15 3/4"
 Weight..... 50-54 lbs.

Made with webs to support 8" super-structure. Also made solid for heavy load-bearing walls.



Header Block

Dimensions as shown on the drawing. For bonding brick veneer with headers every sixth course.

Brick veneer may also be bonded every seventh course by using regular cinder block and cinder brick.

REPRESENTATIVE UNITS

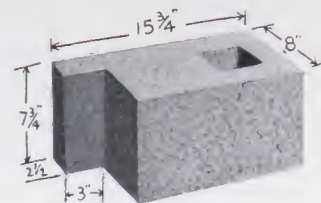
Jamb or Joist Block

Dimensions as shown on drawing.

Weight.....34-35 lbs.

Use as jamb block illustrated on page 34.

Use as joist block illustrated on page 33.

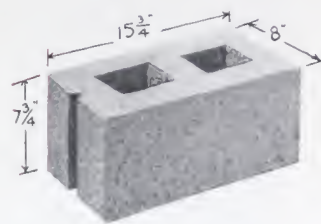


Steel Sash Block

Dimensions as regular block.

Weight, 8 x 8 x 16".....32-34 lbs.

12 x 8 x 16".....50-54 lbs.



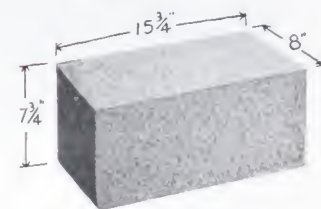
Solid Block

8" and 12" blocks made solid for heavy load-bearing walls.

Weight, 8 x 8 x 16" solid—42-45 lbs.

12 x 8 x 16" 65-70 lbs.

Actual size same as hollow blocks.



Brick

Actual size.....2 1/4 x 3 3/4 x 8"

Weight.....3-4 lbs.

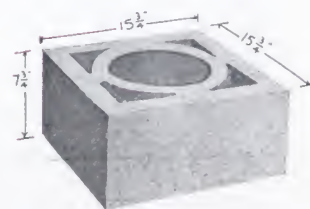


Chimney Block

Regular size shown on drawing.

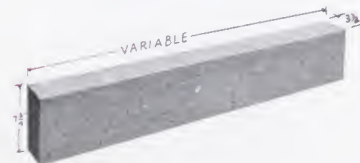
Also made with Stove Pipe Hole.

Chimney caps made to fit these units.



Lintels

All sizes carried in stock or made to order. Width, height and additional reinforcement in proportion to length.



NOTE—6", 8" and 12" CINDER BLOCKS are also manufactured with 3 cores instead of 2. They present identical advantages.

CINDER CONCRETE BUILDING UNITS



Showing the proper method of spreading mortar when laying Cinder Blocks. Care should be used to prevent mortar joints from running through from one face to the other, particularly when laying outside walls. The mason should spread mortar on the course in one operation, instead of laying one block at a time.



Showing the proper method of buttering ends. The blocks should be set on end in a row within easy reach of the mason. The ends should be buttered on the outside and inside only, avoiding all cross joints. The incorrect method of piling block is indicated at the far end of the platform.



Illustrating the use of 8" regular wall block and 8" header block in backing up 4" of brick, making a 13" wall. Note that no through mortar joints occur between the outside and inside faces of the wall. This insures a dry wall.



Illustrating the use of 4" and 8" Cinder Block for backing up stone facing. Any thickness of wall may be obtained by using standard units. The stone should not at any point be continuous through the wall.



Unique effect obtained by use of Standard Cinder Block and Cinder Tile, laid with mortar joints pointed as in stone masonry. Some of the joints cut over the face of the units.



Detail of PLAYERS' THEATRE, Detroit, Michigan, illustrated on page 15. Standard Cinder Block and Cinder Tile laid in "broken Ashlar" design ready for application of paint.

SPECIFICATIONS

SPECIFICATIONS FOR CONSTRUCTION *with* STRAUB *or* BO CINDER BUILDING UNITS

Straub or Bo Cinder Building Units :

The requirements as set forth under the head of General Conditions apply to this work.

All STRAUB or BO CINDER BUILDING UNITS shall be straight, uniform, and sound, and of such character that they will pass and comply with the requirements of the local building code. Besides the regular blocks, use such special shapes and sizes as may be required to accomplish the provisions of the drawings and the aims of the architect.

Mortar :

All mortar used for the setting of STRAUB or BO CINDER BUILDING UNITS shall be composed by volume of one part of Portland Cement (approved brand), to one part hydrated lime and six parts of clean sharp sand thoroughly mixed to a smooth moderately stiff mortar. The lime and cement shall be thoroughly mixed before the addition of sand and water. The resulting mortar mixture shall be used within thirty minutes after the water is added and no retempering shall be permitted. If lime putty is used instead of hydrated lime, mix cement and sand first and then add the lime putty which must be slacked at least three days before using.

Laying :

All hollow blocks shall be laid with the cells vertical in the wall and in such manner that the main bearing webs come in proper relation for bearing with those of the block below. No vertical or horizontal joints shall be mortared through the walls but liberal air spaces shall be left in the center of the walls by buttering the two edges of each block on both horizontal and vertical joints. When 12" blocks are used place mortar over front, center and rear webs, exercising care that the mortar does not carry through the wall. All walls shall be bonded by breaking vertical joints in every course at least three inches.

Foundation Walls :

Where indicated on drawings the foundation walls and piers shall be constructed of STRAUB or BO CINDER BUILDING UNITS of such size and shape as may be required and in conformity with the local building code. Special units shall be used for corners, offsets, and other breaks to maintain a good bond and to insure properly staggered joints throughout the length of the wall.

(In low, damp ground, water bearing clay or where springs or excessive ground water occurs, the outside of foundation walls shall be plastered with a mortar composed of one part Portland Cement to two parts of sand with a mixture of an approved damp-proofing composition and to be applied three-quarters of an inch in thickness. Also, where any quantity of ground water is present or known to occur, a dry drain should be laid around the foundation to carry the water away to a convenient point. Specified under this heading or under the plumbing and drainage work.)

Exterior Walls and Interior Bearing Walls :

All exterior walls above foundation and all interior bearing walls shall be constructed of the various thicknesses as indicated on drawings, forming all corners, returns and offsets as shown, and using the required shapes and sizes to work to corners and openings and to maintain proper bond throughout the length of the wall.

Use special jamb blocks for double-hung window frames.

Use re-inforced STRAUB or BO CINDER CONCRETE LINTELS over all door openings or use lintels of special design as indicated.

Where arches occur in walls they shall be formed of two (or more) courses of cinder brick laid in row-lock fashion on suitable centers.

CINDER CONCRETE BUILDING UNITS

SPECIFICATIONS

Bearing Wall Design :

The design and size of hollow STRAUB or BO CINDER BUILDING UNITS in bearing walls shall be such that the gross sectional area of the block is not stressed greater than one-tenth of the crushing strength of the particular units used, as ascertained by properly conducted test. The super-imposed loadings shall include the dead and live loads of floors and roof and the weight of wall construction, etc., and in no case shall the block be subjected to tensile stress, unless suitable steel reinforcement is provided. Where heavy beams or girders are placed on hollow block walls, or where other concentrated loads occur, the holes shall be filled with concrete or the walls shall be capped with concrete or otherwise re-inforced to properly distribute the load. The interior bearing walls shall be well bonded and tied into outside walls. Fire-places and chimneys shall be built as shown and shall be well bonded into the walls in which they occur.

Partition Walls :

All partition and division walls other than load bearing shall be constructed of light weight hollow STRAUB or BO CINDER BUILDING UNITS of the thickness indicated on the drawings. They must be built true to a line and plumb and must be well tied into other walls and be wedged against floor above. Reinforced lintels are to be used over all openings.

Lintels :

STRAUB or BO CINDER CONCRETE LINTELS shall be built into the walls over the openings as indicated on the drawings and all lintels shall have a modulus of rupture of not less than 800 pounds per square inch.

Porch Columns and Piers :

Porch columns and piers shall be erected with blocks of such sizes as to conform with the dimensions indicated on the drawings.

Where heavy loads are to be carried on columns and piers they shall be built of solid STRAUB or BO UNITS instead of hollow ones.

Chimney :

All chimneys and fire-places shall be constructed of STRAUB or BO CINDER BUILDING UNITS as shown on the drawings, faced with suitable fire brick where exposed to heat.

Provide terra cotta flue linings of sizes indicated for all chimneys, wiping all joints carefully as the several sections are erected.

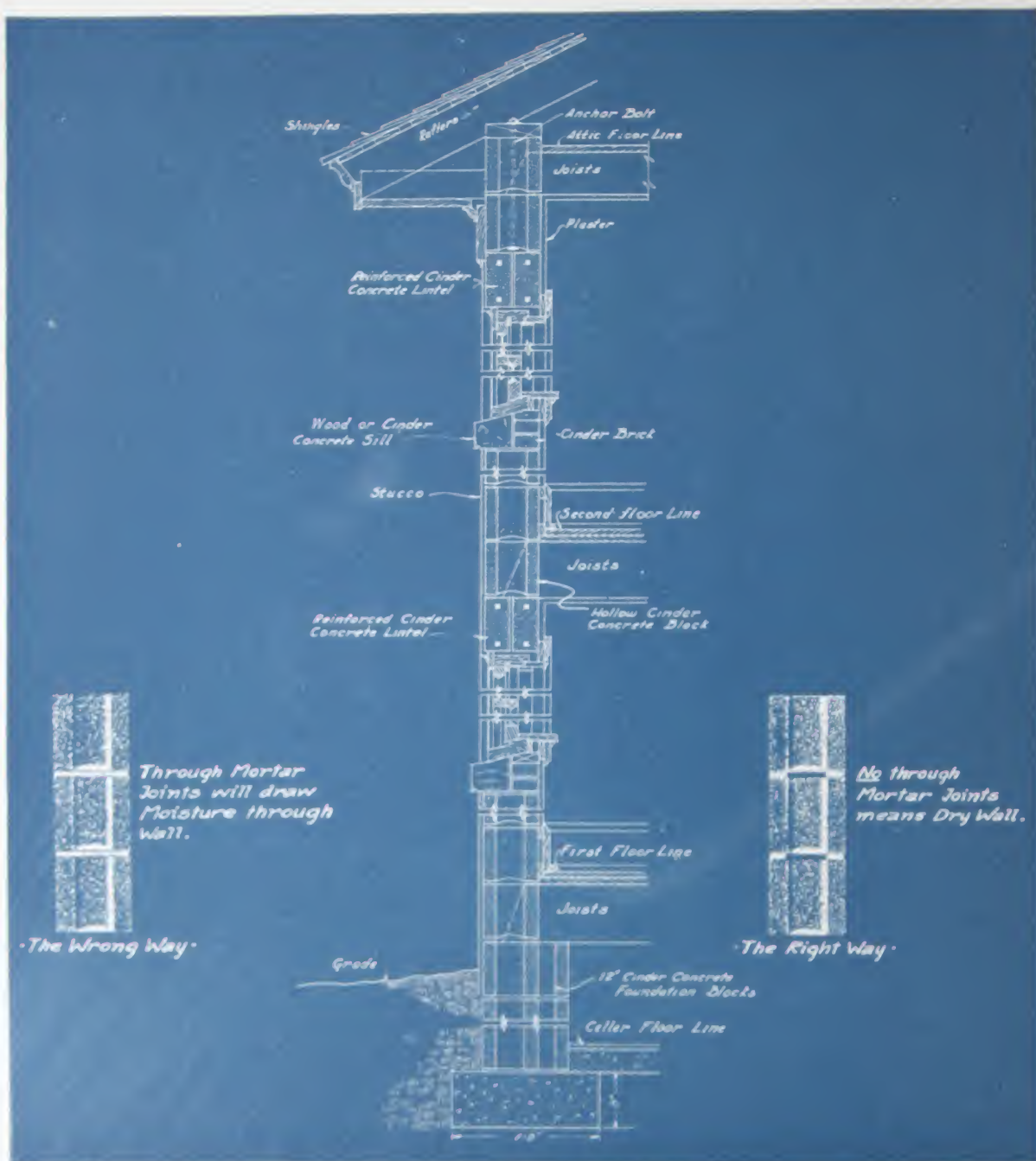
Chimney Cap :

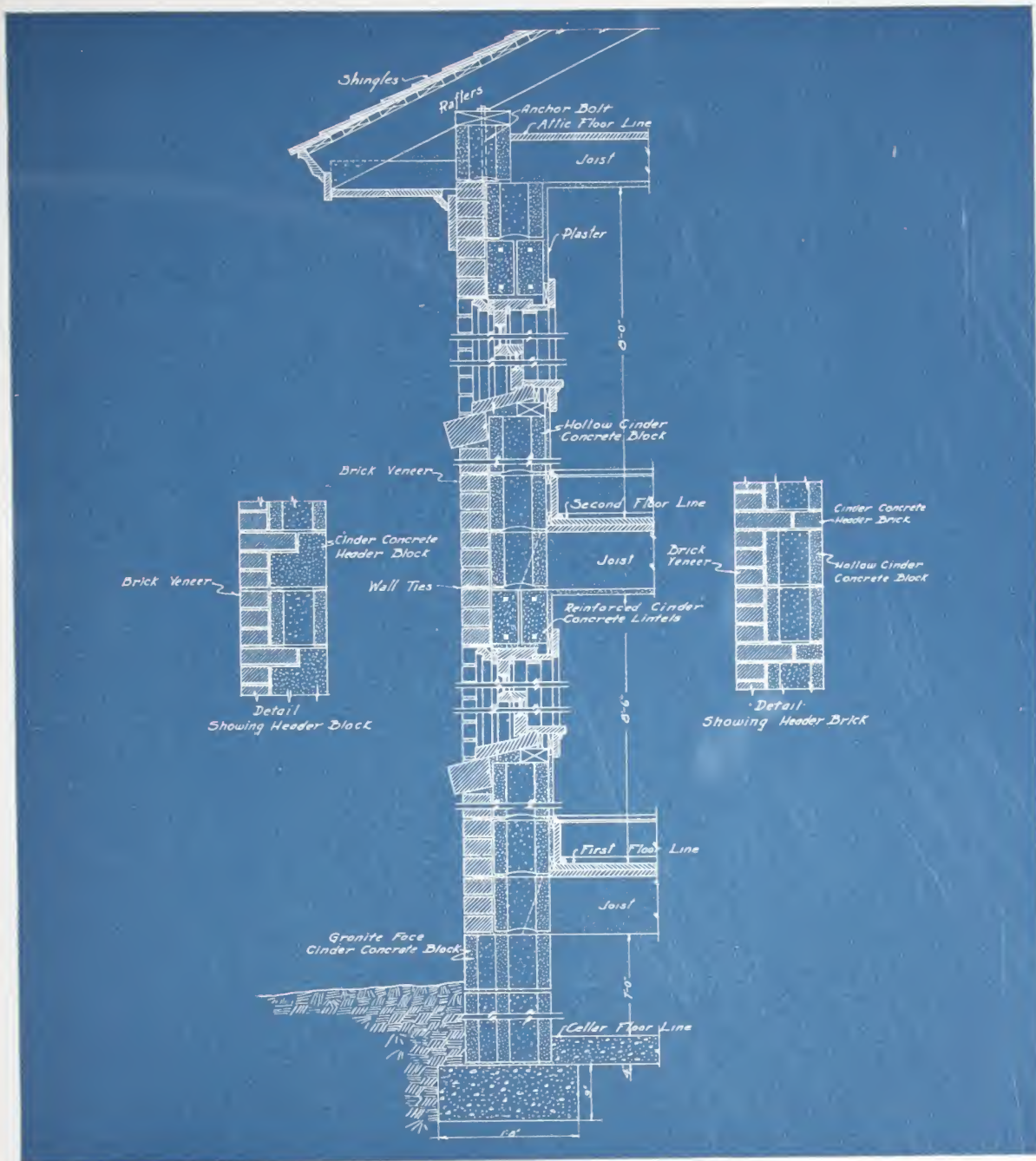
Provide STRAUB or BO CINDER CHIMNEY CAP, pre-cast concrete, stone or brick as indicated on the drawings.

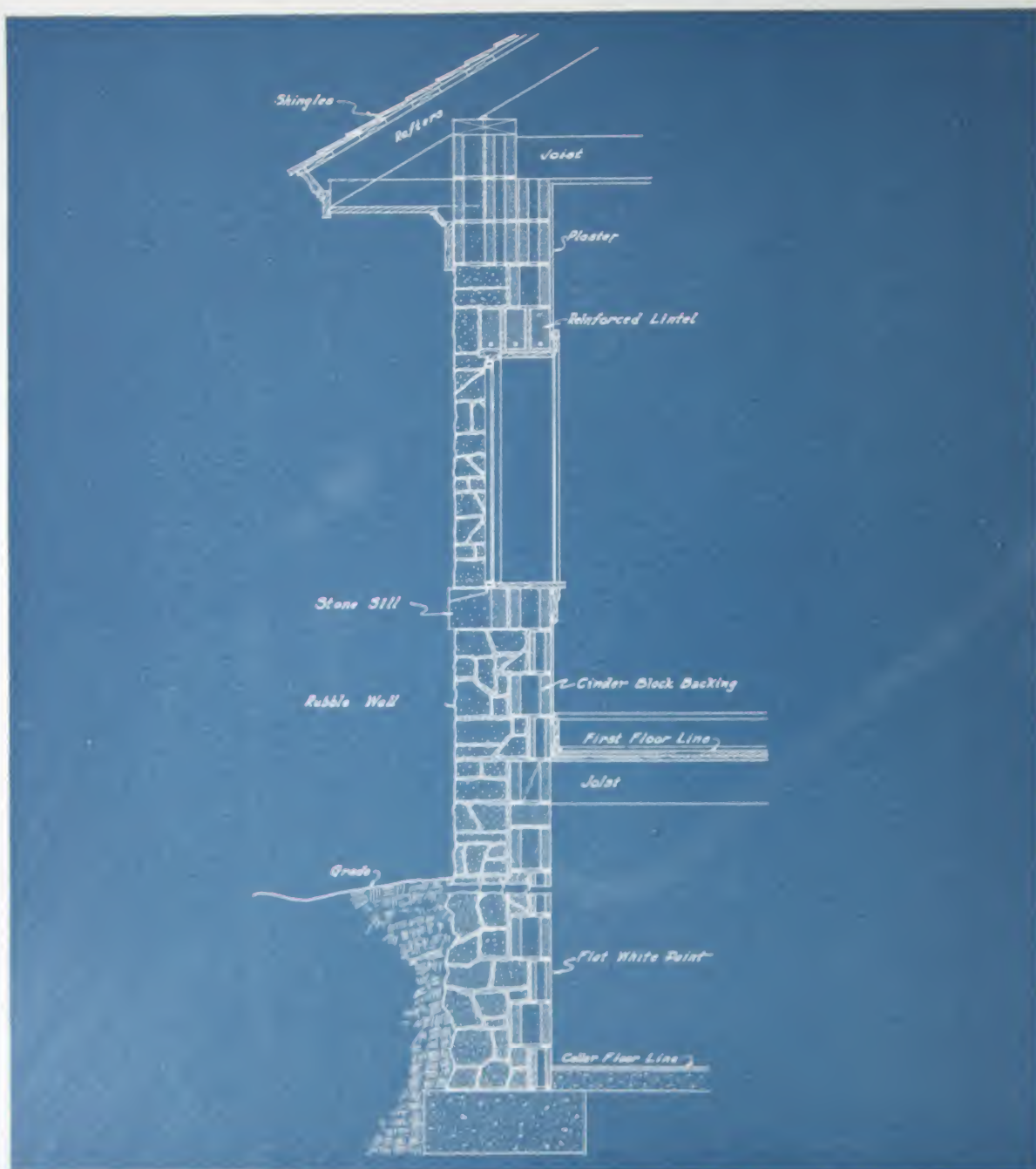
Cutting and Patching :

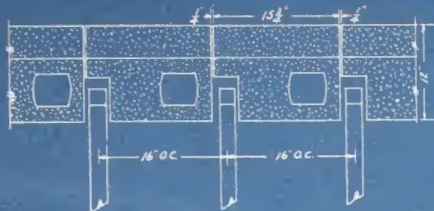
This contractor shall do all cutting and patching of his work, and that of other contractors, required for the proper installation of work by other trades, and any necessary cutting and repairing is to be reported to the architect for adjustment with the contractor for whom such work is done. This contractor shall leave all chases and openings required by other trades and build in all anchors, or other accessories furnished by others. All chases and openings that are built or cut into walls shall, when ready for plastering, be covered with No. gauge galvanized diamond mesh expanded metal lath or woven wire lath by plastering contractor. Lath to be securely fastened into place lapping the face of the block by at least 2" on each side to prevent cracking of plaster. Upon completion, do any patching required and remove all rubbish, equipment and surplus material.

Contractors for plumbing, heating and electric work, and other trades will not be permitted to cut into block walls without permission from the block masonry contractor and generally any cutting and repairing shall be done by the block mason and the cost charged to the contractor requiring same. Contractors for other trades must therefore arrange the installation of their work so that openings and chases may be built in where required, or furnish to, and co-operate with, the mason contractor in setting the sockets, ferrules, pipings, conduits, outlet boxes and fastenings that must be built into the Hollow Block walls. Horizontal chases will not be permitted in block walls, except for flexible conduits for electric wiring.

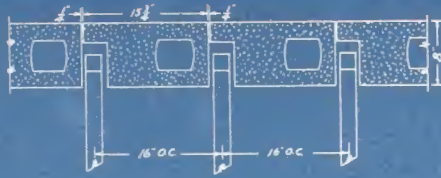








FIRST COURSE
PLAN SHOWING JOIST IN
12" WALL



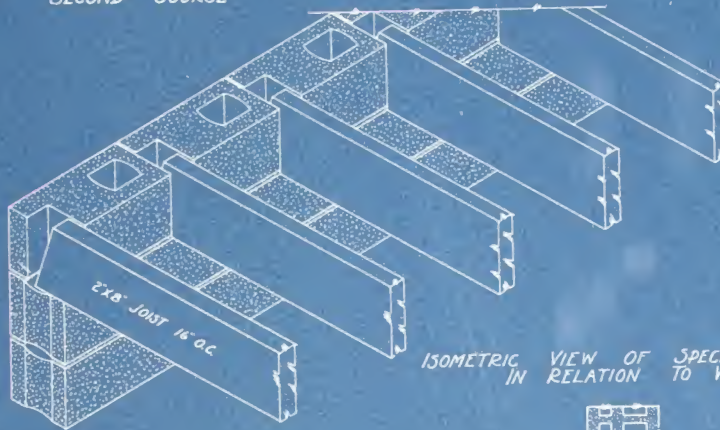
FIRST COURSE
PLAN SHOWING JOIST IN
8" WALL



SECOND COURSE



SECOND COURSE



ISOMETRIC
IN VIEW OF SPECIAL JAMB BLOCKS
IN RELATION TO WOOD JOIST



First Course

8" Wall



Second Course

8" Wall



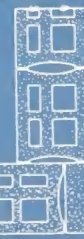
12" Wall

8" Wall

2nd Course (optional)
Applies to Detail on Left
Side of page



First Course

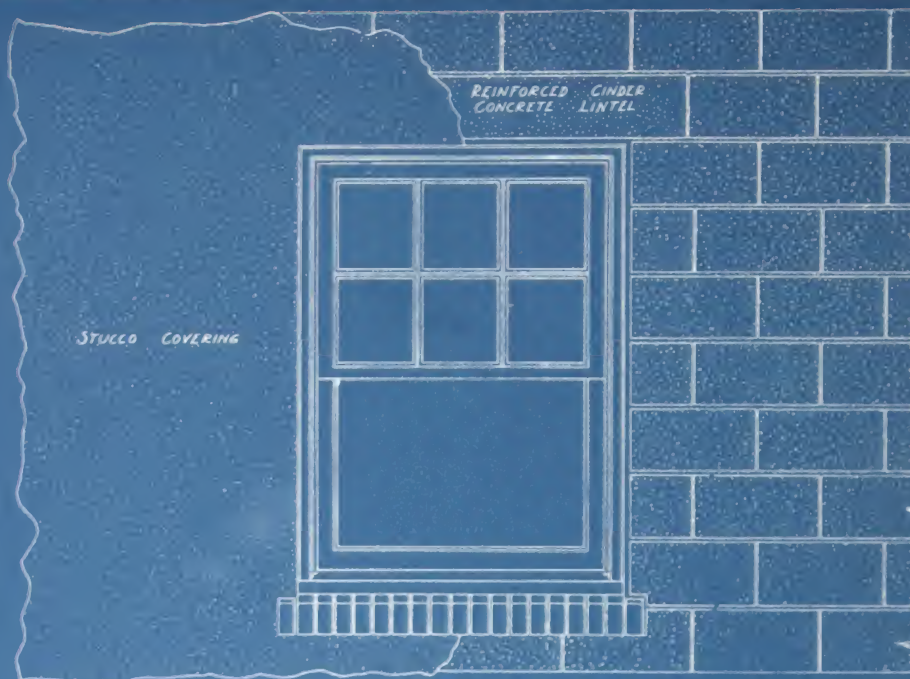


Second Course

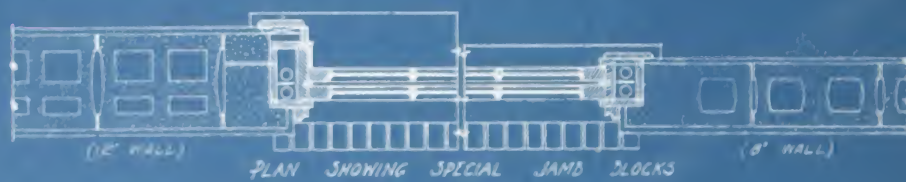
12" Wall



12" Wall



ELEVATION

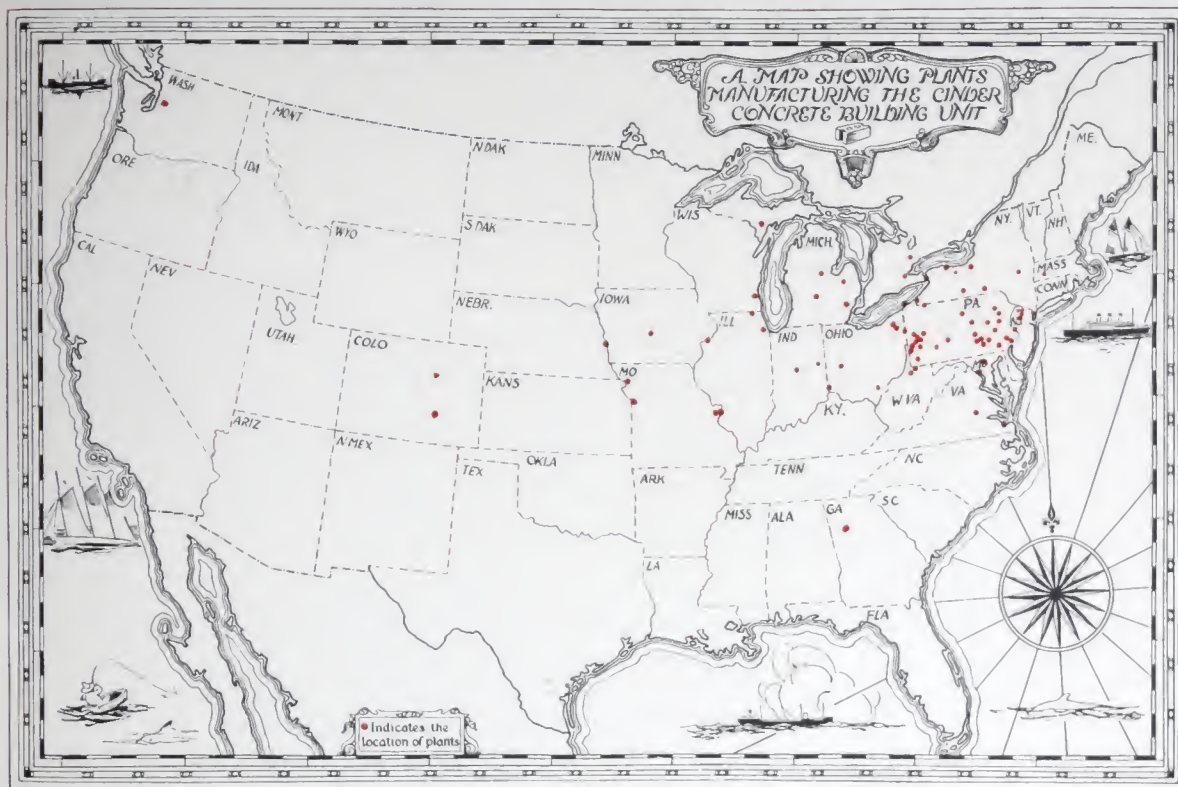


SECTION OF HEAD
SHOWING SPECIAL LINTEL



SECTION OF SILL

NATIONAL DISTRIBUTION



Plants Manufacturing Cinder Concrete Building Units Under Straub or Bo Patents

ALBANY, N. Y. Finch & Ostrander, Inc.
 ALLENTOWN, PA. Hollywood Building Block Co.
 ALTOONA, PA. Juniata Reconstructed Stone Co., Juniata, Pa.
 APOLLO, PA. Apollo Steel Co.
 ATLANTA, GA. Atlanta Cinder Block & Tile Co.
 BALTIMORE, MD. Cinder Block Corp.
 BINGHAMTON, N. Y. Straub Building Units, Inc.
 BRAEBURN, Pa. Braeburn Volcano Block Co.
 BUFFALO, N. Y. Burnett-Wilson-Pfuhl, Inc.
 BUTLER, PA. Shufflin & Green
 CAMDEN, N. J. Concrete Specialties Co.
 CINCINNATI, OHIO. Cincinnati Cinder Corp.
 CLARKSBURG, W. Va. Cinder, Inc.
 DENVER, COLO. Cinder Block Co.
 DES MOINES, IOWA. Iowa Concrete Crib & Cement Products Co.
 DETROIT, MICH. Detroit Cinder Block & Tile Co.
 DETROIT, MICH. R. E. Hamilton's Sons
 EAST ST. LOUIS, ILL. Atlas Cinder Block Corp.
 ELMIRA, N. Y. Elmira Building Units, Inc.
 ERIE, PA. Erie Patent Block Co., Inc.
 ESCANABA, MICH. Universal Magnesite Products Co.
 FAIRMONT, W. Va. Fairmont Wall Plaster Co.
 (Sub-licensees and distributors in West Virginia)
 FLINT, MICH. Flint Cinder Block & Products Co.
 FOREST PARK, ILL. Illinois Cinder Products Corp.
 GENEVA, N. Y. Geneva Brick Products Co.
 GREENSBURG, PA. Building Materials Co.
 HAMILTON, ONT., CANADA. E. J. Shepard, Ltd.
 HARRISBURG, PA. Harrisburg Building Block Co.
 INDIANAPOLIS, IND. Straub Cinder Block Co.
 JAMESTOWN, N. Y. Jamestown Block & Tile Co.
 JERSEY CITY, N. J. Cinder Brick and Tile Co.
 JOHNSTOWN, PA. Art Stone Block Co.
 KANSAS CITY, MO. Cinder Block Co.
 LANCASTER, PA. Lancaster Concrete Tile Co.
 LANSING, MICH. Universal Block Co.
 LEMOYNE, PA. Pennsylvania Concrete Roofing Tile Co.
 LEWISTOWN, PA. James L. Shreffler
 MCHENRY, ILL. Frett Brothers
 MANORVILLE, PA. Eddy Brothers
 MIDLAND, MICH. John A. Whitman
 MILWAUKEE, WIS. Cincrete Products Corp.

MOLINE, ILL. Moline Cast Stone Co.
 MT. POCONO, PA. L. T. Smith
 NEW CASTLE, PA. Straub Block Co.
 NEW KENSINGTON, PA. Straub Block Co.
 NEW YORK, N. Y. Cinder Tile Co.
 NORFOLK, VA. Norfolk Building Block Corp.
 NORTH BERGEN, N. J. Hudson Fireproof Block Co.
 OMAHA, NEB. Ideal Cement Stone Co.
 PHILADELPHIA, PA. Phila. Partition & Building Block Co.
 PITTSBURGH, PA. Straub Block Co.
 POTTSVILLE, PA. Pottsville Building Block Co.
 PUEBLO, COLO. Pueblo Cinder & Cement Products Co.
 READING, PA. Berks Building Block Co.
 RIDGEFIELD PARK, N. J. Bergen Building Block Co.
 RICHMOND, VA. Richmond Patent Building Block Corp.
 RIVER GROVE, ILL. Chicago Granite Co.
 ROCHESTER, N. Y. Rochester Cinder Block Corp.
 ROCHESTER, N. Y. Genesee Brick & Supply Corp.
 ROCHESTER, N. Y. Schaefer Bros. Builders Supply Co.
 ST. JOSEPH, MO. Cinder Block Co., Clayton, Mo.
 ST. LOUIS, MO. Concrete Structural Units Co.
 SEATTLE, WASH. Cinder Products Co.
 SELINGROVE, PA. Brown Building Block Co.
 SPRINGDALE, PA. Springfield Sand & Tile Co.
 SPRINGFIELD, MASS. Springfield Cinder Block Co.
 SPRINGFIELD, OHIO. Syracuse Cinder Products Corp.
 SYRACUSE, N. Y. Frank H. Thompson
 TARENTUM, PA. Toronto Brick Co., Ltd.
 TORONTO, ONT., CANADA. Concrete Specialties Company
 TRENTON, N. J. Hankins-Paulson Co.
 UNIONTOWN, PA. Straub Patented Block Co.
 WARREN, OHIO. Wilson-Wetmore Lumber Co.
 WARREN, OHIO. Washington Concrete Products Corp.
 WASHINGTON, D. C. J. E. Drury
 WAYNESBURG, PA. Hudson Fireproof Block Co.
 WESTFIELD, N. J. Nepenna Building Materials Co. (Kingston, Pa.)
 WILKES-BARRE, PA. Delvan Block Co., So. Williamsport, Pa.
 WILLIAMSPORT, PA. Cinder Block Corp.
 WILMINGTON, DEL. York Patented Building Block Co.
 YORK, PA. Peter Klug
 YOUNGSTOWN, OHIO. Garland Block & Sand Co.
 YOUNGSTOWN, OHIO. Garland Block & Sand Co.

NATIONAL BUILDING UNITS CORPORATION

THE National Building Units Corporation was formed by a consolidation of the original parent companies controlling the STRAUB and BO PATENTS and seventeen plants manufacturing CINDER BLOCK and CINDER TILE throughout the country.

The total number of plants, subsidiary and licensed, is more than eighty—spanning the country from coast to coast and from Canada to Georgia. This co-ordinated industry possesses all the advantages of national contacts, national credit standing and national distributing capacity.

New plants are being established in territory which is still open, and responsible parties will be licensed to manufacture and sell CINDER CONCRETE BUILDING UNITS under the STRAUB and BO PATENTS.

NATIONAL BUILDING UNITS CORPORATION
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